

What is claimed is:

1. A plasma etching equipment for especially anisotropic etching of a substrate by the action of a plasma, having a first plasma-generating device which has a first means for generating a first high-frequency electromagnetic alternating field, an etching chamber for generating a first plasma of reactive particles by the action of the first high-frequency electromagnetic alternating field upon a first reactive gas, and a first gas supply; the substrate to be etched being positioned in the etching chamber, wherein a second plasma-generating device (32) is preconnected to a first plasma-generating device (31) and has a second means (20) for generating a second high-frequency electromagnetic alternating field, a plasma-generating region (33) for generating a second plasma (18) from reactive particles by the action of the second high-frequency electromagnetic alternating field upon a second reactive gas, and a second gas supply (16); the second plasma (18) being able to be supplied at least partially, as the first reactive gas, to the first plasma-generating device (31) via the first gas supply (32).
2. The plasma etching equipment as recited in Claim 1, wherein the first plasma-generating device (31) is an inductively coupled plasma-generating device, which has as the first means at least one ICP coil (11).
3. The plasma etching equipment as recited in Claim 1, wherein the first plasma-generating device (31) has a substrate electrode (12), connected to a high-frequency voltage source by a supply line (15), with which an ion stream contained in the first plasma (21) can be accelerated onto the substrate (13).
4. The plasma etching equipment as recited in Claim 1, wherein the second means (20) is a microwave generator (20), especially a magnetron or a magnetron tube, and the second plasma-generating device (32) is a microwave plasma-generating device.
5. The plasma etching equipment as recited in Claim 1 or 4, wherein the second plasma-generating device (32) has a cavity resonator (34).

6. The plasma etching equipment as recited in Claim 5, wherein the cavity resonator (34) has a tuning device (17) for tuning the resonant frequency of the cavity resonator (34).
7. The plasma etching equipment as recited in Claim 5 or 6, wherein the cavity resonator (34) has an adaptation device (19) for adapting a microwave mode generated by the microwave plasma-generating device to the second plasma (18).
8. The plasma etching equipment as recited in Claim 7, wherein the microwave plasma-generating device has at least one directional coupler (35) and is in contact with an absorber of microwave radiation, in particular a water load.
9. The plasma etching equipment as recited in at least one of the preceding claims, wherein the first plasma-generating device (31) and the second plasma-generating device (32) are connected to each other, open to the passage of gas, via a dielectric tube (22), especially a quartz tube or a ceramic tube, the dielectric tube (22) being in contact with the first gas supply (32) and the second gas supply (16) in a manner open to the passage of gas.
10. The plasma etching equipment as recited in at least one of the preceding claims, wherein the plasma-generating region (33) is located inside the cavity resonator (34) in surroundings of the connection of the first plasma-generating device (31) to the second plasma-generating device (32) on the inside of the dielectric tube (22) which crosses the cavity resonator in some regions.
11. The plasma etching equipment as recited in at least one of the preceding claims, wherein the dielectric tube (22) forms the second gas supply (16).
12. The plasma etching equipment as recited in at least one of the preceding claims, wherein, between the first plasma-generating device (31) and the second plasma-generating device (32), a discharge device (23) is provided which has the effect of at least partially discharging ions and/or electrons from the second plasma (18).

13. The plasma etching equipment as recited in at least one of the preceding claims, wherein the discharge device (23) can be heated.
14. The plasma etching equipment as recited in at least one of the preceding claims, wherein the discharge device (23) is positioned inside the dielectric tube (22) and/or near the entrance of the first gas supply (32) into the first plasma-generating device (31).
15. The plasma etching equipment as recited in at least one of the preceding claims, wherein the discharge device (23) is a metallic or ceramic grid, a perforated plate or a showerhead.
16. The plasma etching equipment as recited in at least one of the preceding claims, wherein the discharge device (23) is positioned between the first plasma-generating device (31) and the second plasma-generating device (32) in such a way that the first reactive gas which can be supplied to the first plasma-generating device (31) via the first gas supply (32) passes through at least almost completely through the discharge device (23).